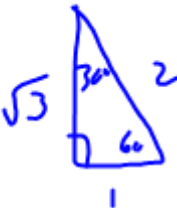
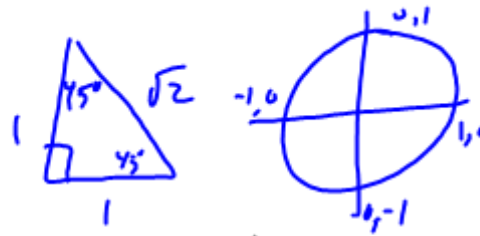


Give exact answers

$$\frac{\pi}{6} = 30^\circ$$

$$\frac{\pi}{3} = 60^\circ$$

$$\frac{\pi}{4} = 45^\circ$$

$$\cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$$

$$\sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$$

$$\sin\left(\frac{3\pi}{2}\right) = -1$$

$$\cos\left(\frac{7\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

$$\cos(0) = 1$$

$$\cos\left(\frac{\pi}{2}\right) = 0$$

$$\sin\left(\frac{3\pi}{4}\right) = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos(2\pi) = 1$$

$$\sin\left(\frac{7\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\tan\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{1}$$

#48
in 3.2

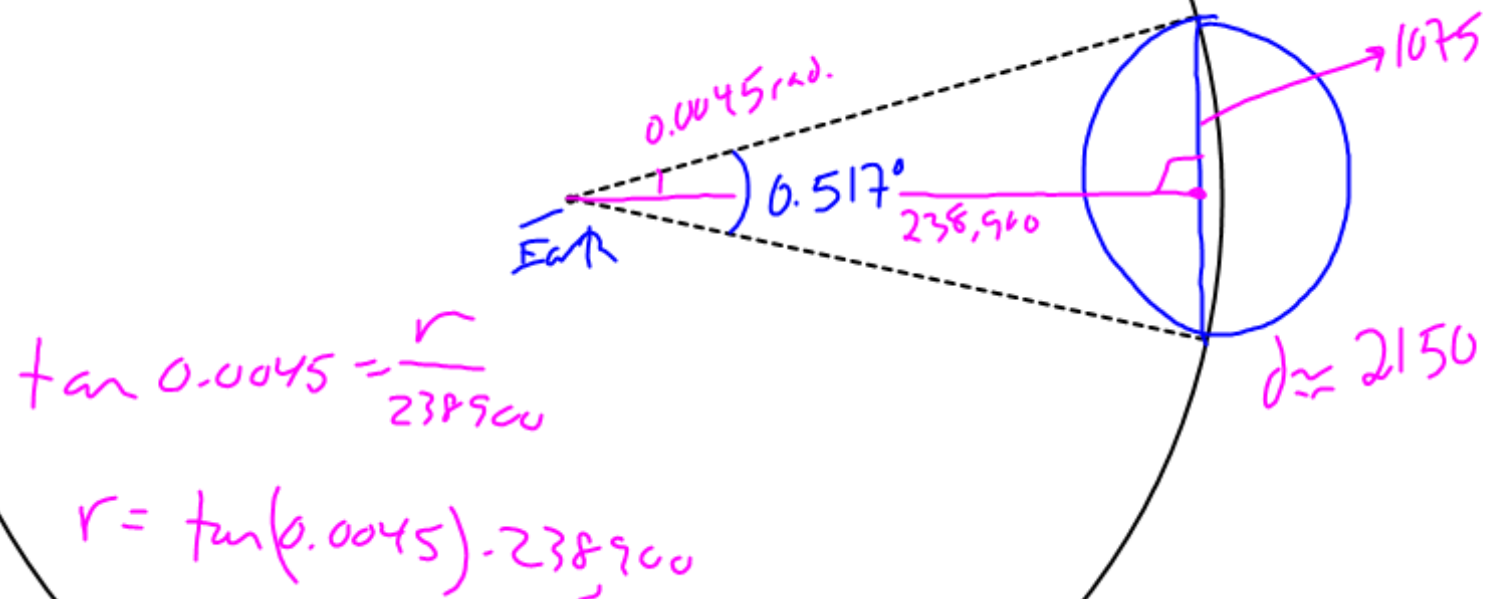
$$0.517^\circ \cdot \frac{\pi}{180^\circ} = 0.009 \text{ rad.}$$

$$s = 238,900(0.009) = 2,156 \text{ mi}$$

$$s = r\theta$$

$s = \text{approx. diam.}$

$$r = 238,900$$



$$\tan 0.0045 = \frac{r}{238,900}$$

$$r = \tan(0.0045) \cdot 238,900$$

#23 in 3.2



$$r = 1.38$$

$$r = 4.72$$

$$\theta = 10.9 \text{ rad.}$$

$$\theta = 180^\circ \text{ or } \pi \text{ radian}$$

$$s = 4.72\pi \longleftrightarrow s = 4.72\pi$$

$$4.72\pi = 1.38\theta$$

$$\theta = \frac{4.72\pi}{1.38} \approx 10.9 \text{ radians}$$

$$\frac{4.72\pi}{r} = 13.6$$

$$\theta = 10.9 \text{ rad.}$$

$$s = 13.6 \cdot 10.9$$

$$\approx 146'' \approx 12'$$

A standard record is 12" in diameter and rotates $33\frac{1}{3}$ times per min.

- (a) Find the angle of rotation for the record in 10 seconds, 1 second in radians
- (b) Find the speed in inches per second of a point on the outer edge of the record.
- (c) Find the speed in inches per second of a point 1 inch out from the center.

$$\textcircled{1} \frac{1.11\pi}{1} \text{ or } \frac{10\pi}{9} \text{ radians}$$

$$\frac{33\frac{1}{3}}{60} \approx 0.55 \cdot 2\pi$$

↓
rotations

* rotations $\cdot 2\pi = \theta$ in radians
 rotates
 revolutions

$$\textcircled{2} \quad s = r\theta$$

$$s = 6 \left(\frac{10\pi}{9} \right)$$

$$\approx 20.9 \text{ in/sec}$$

$$\textcircled{3} \quad s = 1 \left(\frac{10\pi}{9} \right)$$

$$\approx 3.49 \text{ in/sec}$$

$$\textcircled{a} \quad \frac{33\frac{1}{3}}{60} \Rightarrow 0.55 \text{ rotations in 1 sec}$$

$$\frac{200\pi}{180} = \frac{10\pi}{9}$$

$$0.55 \cdot 2\pi \Rightarrow 3.49 \text{ radians in 1 second}$$

angular
velocity

* rotations $\cdot 2\pi \Rightarrow$ radians

$$\textcircled{b} \quad \theta = 3.49 \text{ radians} \quad \frac{10\pi}{9} \text{ radians}$$

$$C = 26\pi \approx 37.7 \text{ in}$$

$$37.7 \text{ in} \cdot 33\frac{1}{3} \div 60 \approx 20.94 \text{ in/sec.} \quad \text{linear velocity}$$

$$s = r\theta$$

$$s = 6(3.49) \approx 21 \text{ in/sec}$$

$$\textcircled{c} \quad s = r\theta$$

$$s = 1(3.49) \approx 3.49 \text{ in/sec} \quad \text{linear velocity}$$

$$* S = r\theta \rightarrow \text{Angle}$$

\downarrow dist. \downarrow radius \downarrow in radians

$$* V = \frac{S}{t} \rightarrow \text{time}$$

\downarrow velocity

$$* \omega = \frac{\theta}{t} \rightarrow \text{radians}$$

\downarrow angular velocity

$$* S = r\omega t \quad b/c \quad \omega = \frac{\theta}{t}$$

$$\theta = \omega t$$

plug

$$S = r\theta$$

$$* V = \frac{r\theta}{t}$$

$\rightarrow b/c$

$$S = r\theta$$

plug

$$V = \frac{S}{t}$$

$$* V = r\omega$$

$\downarrow b/c$

$$\frac{\theta}{t} = \omega$$

$$So \quad V = r \frac{\theta}{t}$$

$$V = r\omega$$

Sect 3.4

master examples 1-3

Sect. 3.4

1, 3, 4, 5, 7, 11, 15, 19, 27, 29, 35, 39, 40, 43